Networking Research in the Networking and Information Technology R&D Program

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"Roadmap to Recovery"

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Federal Networking and Information Technology Research and Development Program (NITRD)

- Coordinates and focuses interagency R&D:
  - Identify common research needs
  - Plan inter-agency research programs
  - Coordinate research announcements and funding
  - Review research results and adjust accordingly
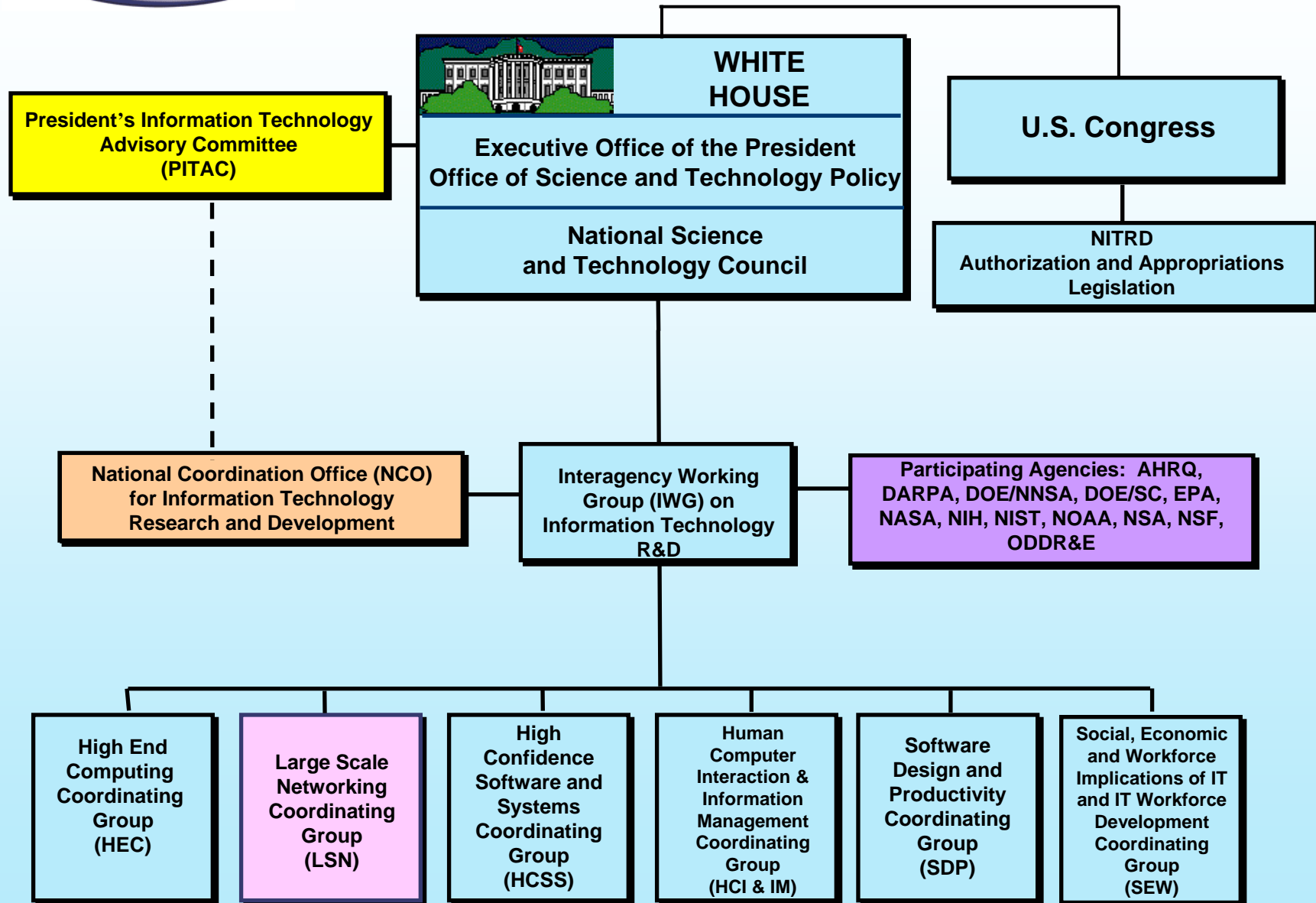- Includes 14 federal agencies, about $2B budget
- www.nitrd.gov

- Department of Defense
  - Defense Advanced Research Projects Agency (DARPA)
  - Defense Information Systems Agency (DISA)
  - National Security Agency (NSA)
  - Office of the Director of Defense Research and Engineering (ODDR&E)
- Department of Energy
  - Office of Science (DOE/SC)
  - National Nuclear Security Administration (DOE/NNSA)
- Department of Health and Human Services
  - National Institutes of Health (NIH)
  - Agency for Health Research and Quality (AHRQ)
- Department of Commerce
  - National Institute of Standards and Technology (NIST)
  - National Oceanic and Atmospheric Administration (NOAA)
- National Science Foundation (NSF)
- National Aeronautics and Space Administration (NASA)
- Environmental Protection Agency (EPA)
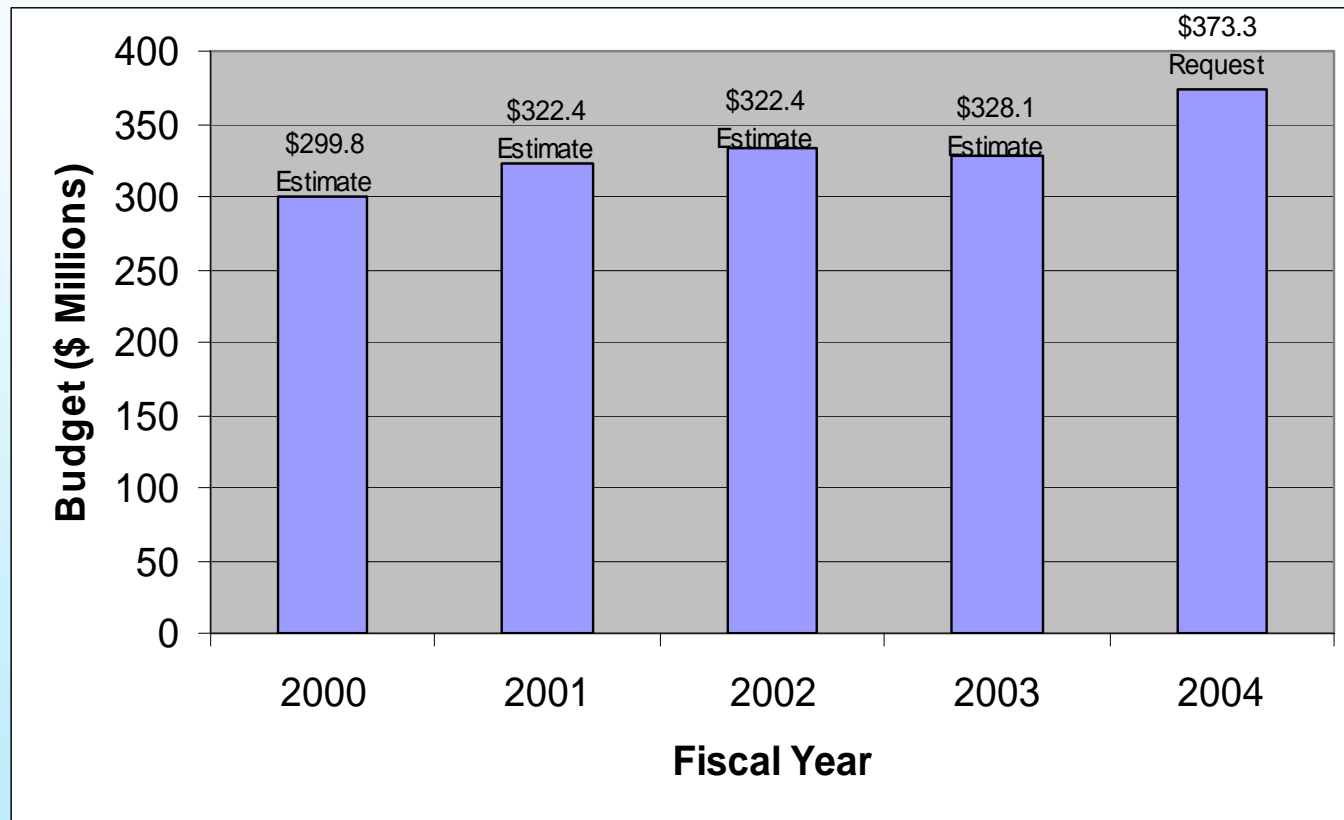- Observer: Federal Aviation Administration (FAA)

NITRD Program Coordination

President's Information Technology Advisory Committee (PITAC)

WHITE HOUSE

Executive Office of the President Office of Science and Technology Policy

National Science and Technology Council

U.S. Congress

NITRD Authorization and Appropriations Legislation

National Coordination Office (NCO) for Information Technology Research and Development

Interagency Working Group (IWG) on Information Technology R&D

Participating Agencies: AHRQ, DARPA, DOE/NNSA, DOE/SC, EPA, NASA, NIH, NIST, NOAA, NSA, NSF, ODDR&E

High End Computing Coordinating Group (HEC)

Large Scale Networking Coordinating Group (LSN)

High Confidence Software and Systems Coordinating Group (HCSS)

Human Computer Interaction & Information Management Coordinating Group (HCI & IM)

Software Design and Productivity Coordinating Group (SDP)

Social, Economic and Workforce Implications of IT and IT Workforce Development Coordinating Group (SEW)

Federal Large Scale Networking Research Budgets

Research Areas of Emphasis for Large Scale Networking

- **Optical Network Testbed Coordination**
  - Build on Developing Federal, Regional, and State Testbeds
- **End-to-end Performance Measurement**
  - Joint Engineering Team (JET) working to implement coordinated, cross-domain performance measurement
- **Grid Outreach and Collaboration Support**
  - Middleware Initiative: Develop standardized tools and promote their adoption
- **Network Security**
  - Cybertrust
  - Best practices: JET
- **Autonomic Networking/Sensornets**
  - DARPA, NSF

Federal Optical Network Testbeds

- **UltraSciencenet: DOE**
  - Sparse, lambda-switched, dedicated, channel-provisioned testbed
  - Ciena, Calient switching technology
  - Expected ESnet 2 x OC48 between Sunnyvale and Chicago plus dedicated lambdas on NLR

- **CHEETAH: NSF**
  - Dedicated channel: High-speed Ethernet mapped to Ethernet-over-SONET circuit
  - Multi-Service Provisioning Platforms (MSPP) class devices that map Ethernet to Ethernet over SONET, cross-connect dynamically, and rate-control Ethernet ports

- **DRAGON: NSF, Application Support**
  - Dynamic provisioning of deterministic end-to-end paths
  - Rapid provisioning of application-specific net topologies
  - Reserve resources and topology in advance, instantiate as needed
  - Provide AAA
  - Protocol, format, framing agnostic: direct transmisison of any optical signal

- **Coordination with National Lambda Rail, STARLight, HOPI (Internet2), Regional, State, and Local Optical Networking Testbeds**
  - National Lambda Rail
    - Point-to-point waves: 10 GigE LAN PHY, OC-192 Cisco systems
    - Switched Ethernet network using Cisco switches
    - Experimental IP network using Cisco routers
    - Dark fiber for optical layer research
    - Traditional NOC services
    - Dense Wave Division Multiplexing national optical footprint
  - HOPI
    - MPLS tunnels on Abilene
    - Internet2 Wave on the NLR footprint
    - Cooperation with Regional Optical Networks (RONs)

- **Changed opportunities or priorities lead to new topics**
- **New area starts with significant research planning**
  - Workshops
  - Research needs documents
  - Roadmaps
- **Need matches agency(s) missions**
- **Time for budgeting, including reducing lesser priority work**
- **Solicitations announced**
- **Projects awarded**
- **Progress reviews and adjustments**

For Further Information

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Or visit us on the Web:

www.nitrd.gov